FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: January 20, 1992
Date Submitted: January 9, 1992
Project: 7238 Metro Self Monitor, PO #M22990 and PO #M23007

RESULTS OF ANALYSES OF THE WATER SAMPLE FOR SELECTED METALS BY ICP (6010) Results Reported as mg/L (ppm)

Sample #	Chromium	Copper	Nickel	Zinc
M22990A	0.38	0.12	0.28	0.02
Quality Assurance				
Method Blank	<0.02	<0.02	<0.02	<0.02
M22990A (Duplicate)	0.44	0.13	0.27	<0.02
M22990A (Matrix Spike) Percent Recovery	104%	104%	107%	115%
M22990A (Matrix Spike Duplicate) Percent Recovery	106%	104%	109%	117%
Spike Blank Percent Recovery	105%	103%	107%	112%
Spike Level	5	5	10	5

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RESULTS OF ANALYSES OF THE LIQUID SAMPLES FOR TOTAL METALS BY INDUCTIVELY COUPLED PLASMA (ICP) METHOD 6010
Results Reported as µg/g (ppm)

Sample #	M22990B	M22990C	M22880D
Analyte:			
Arsenic	<100 **ip**	<100 **ip**	<100 **ip**
Cadmium	<50 **ip**	<50 **ip**	<50 **ip**
Chromium	19,000	13,000	17,000 **ve**
Lead	<50 **ip**	<50 **ip**	160
Silver	<20 **ip**	<20 **ip**	<20 **ip**
Copper	2,000	2,200	460
Nickel	15,000	10,000	6,400 **ve**
Zinc	140	70	11,000 **ve**

ip - Interferences were present which prevented the identification and quantitation of the analyte at the established detection limit.

ve - The value reported exceeded the calibration range established for the sample.

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Sample #	M23007A	M23007B	M23007C
Analyte:			
Arsenic	<100 **ip**	<100 **ip**	<100 **ip**
Cadmium	<50 **ip**	<50 **ip**	<50 **ip**
Chromium	2,400	36,000	40,000
Lead	<50 **ip**	<50 **ip**	<50 **ip**
Silver	<20 **ip**	<20 **ip**	<20 **ip**
Copper	70	5,000	7,400
Nickel	2,300	45,000	35,000
Zinc	41	310	380

ip - Interferences were present which prevented the identification and quantitation of the analyte at the established detection limit.

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Results Reported as µg/g (ppm)
Quality Assurance

Sample #	Method Blank	M23007C (Duplicate)
Analyte:		
Arsenic	<2	<100 **ip**
Cadmium	<0.4	<50 **ip**
Chromium	<0.4	40,000
Lead	<1	<50 **ip**
Silver	<0.1	<20 **ip**
Copper	<0.4	6,900
Nickel	<0.4	36,000
Zinc	<0.4	41

ip - Interferences were present which prevented the identification and quantitation of the analyte at the established detection limit.

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Results Reported as % Recovery
Quality Assurance

Sample #	M23007C Matrix Spike % Recovery	M23007C Matrix Spike Duplicate % Recovery	Spike Level
Analyte:			
Arsenic	**ip**	**ip**	50
Cadmium	**ip**	**ip**	25
Chromium	**ai**	**ai**	25
Lead	**ip**	**ip**	50
Silver	**ip**	**ip**	10
Copper	**ai**	**ai**	25
Nickel	**ai**	**ai**	50
Zinc	**ai**	**ai**	25

ip - Interferences were present which prevented the identification and quantitation of the analyte at the established detection limit.

ai - The amount spiked was insufficient to give meaningful recovery data.

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Quality Assurance

Sample #	Spike Blank % Recovery	Spike Level
Analyte:		
Arsenic	120%	50
Cadmium	117%	25
Chromium	126%	25
Lead	125%	50
Silver	53%	10
Copper	117%	25
Nickel	130%	50
Zinc	124%	25

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RESULTS OF ANALYSES OF THE LIQUID SAMPLES FOR SPECIFIC GRAVITY

Sample #	Specific Gravity
M22990B	1.3
M22990C	1.2
M22990D	1.1

Quality Assurance

M22990D (Duplicate)	1.1

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RESULTS OF ANALYSES OF THE LIQUID SAMPLES FOR % ACID AS HNO_3

Sample #	% Acid as HNO_3
M22990B	9.3%
M22990C	8.5%
M22990D	7.9%

Quality Assurance

M22990D (Duplicate)	8.1%

FRIEDMAN & BRUYA, INC.
3008-B 16th Avenue West
Seattle, WA 98119

1-M2P-B

SAMPLE CHAIN OF CUSTODY

Send Report To:
Company: ALASKAN COPPER WORKS — Contact: GREG SPEER
Address: P.O. BOX 3546
City, State, Zip: SEATTLE, WA. 98124
Phone #: (206) 623-5800 — Date: 1/8/92

SITE NO.	PROJECT NAME	PURCHASE ORDER #
7238	METRO SELF. MONITOR	M22990 / M23007

SAMPLERS *(signature)*	PROJECT LOCATION
Gregory A. Speer	3200 6th AVE. SOUTH

REMARKS	SAMPLE DISPOSAL INFORM.
	☐ Dispose after 30 days ☒ Return Samples ☐ Call for Instructions

SAMPLE #	Date/Time Sampled	Type of Sample	# of Jars	Lab Sample #	Analyses Requested
M22990 A	1/7/92	WATER	1	26300	Cr, Cu, Ni, Zn
M22990 B	1/7/92	ACID	1	26301	Ag, Ar, Cd, Cr, Cu, Ni, Pb, Zn % HNO3, SPECIFIC GRAVITY
M22990 C	1/7/92	ACID	1	26302	Ag, Ar, Cd, Cr, Cu, Ni, Pb, Zn % HNO3, SPEC. GRAVITY
THIS SAMPLE [illegible] ARRIVE @ LAB TOCAH [illegible] M22990 [illegible]	1/7/92	ACID	1	26335	Ag, Ar, Cd, Cr, Cu, Ni, Pb, Zn % HNO3, SPEC. GRAVITY
M23007 A	1/8/92	SAND	1	26303	TOTAL METALS
M23007 B	1/8/92	SLUDGE	1	26304	TOTAL METALS
M23007 C	1/8/92	SLUDGE	1	26305	TOTAL METALS

SIGNATURE	PRINT NAME	COMPANY	Date	Time
Relinquished by: Gregory A. Speer	GREG SPEER	ALASKAN COPPER WORKS	1-9-92	
Received by: [signature]	M.A. DANFORD	FRIEDMAN & BRUYA, INC.	1-9-92 ~~1-9-92~~	
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Andrew John Friedman
James E. Bruya, Ph.D.
(206) 285-8282

3008-B 16th Avenue West
Seattle, WA 98119
FAX: (206) 283-5044

January 20, 1992

Greg Speer, Project Leader
Alaskan Copper
628 South Hanford
Seattle, WA 98134

Dear Mr. Speer:

Enclosed are the results of the analyses of the samples submitted on January 9, 1992 from Project 7238 Metro Self Monitor, PO #M22990 and PO #M23007.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this material, or if you just want to discuss any aspect of your projects, please do not hesitate to contact me.

Sincerely,

Mark Z Perin, Chemist

MZP/dp

Enclosures

FRIEDMAN & BRUYA, INC.

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